BEYOND THE GAP: A HISTORICAL PERSPECTIVE ON WORLD WAR II RIVER CROSSINGS

A Monograph

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Crossing a river against a defending enemy force is a difficult and complex task for any army. History has shown that preparation is necessary to avoid disasters during this type of operation. In 2003, the Third Infantry Division crossed the Euphrates River because it was prepared for this task and possessed the necessary equipment. Since then, no other divisions or corps has executed river crossing operations.

While the United States Army focused on counterinsurgency operations during the last twelve years, it underwent significant changes to adapt to meet the adversities on the battlefield. It transformed its war-fighting organizations, trained its corps and divisions with computer simulations, and relegated field training to brigade and below units. In addition, its current doctrine now refers to river crossings as the deliberate wet gap crossing. Because of these changes, many questions arose as to the present corps and divisions' preparedness to do large-scale operations, to include its ability to plan, prepare, and execute the deliberate wet gap crossing. If called today, could these organizations conduct this complex operation? Examining river crossings in Europe during the Second World War was appropriate for insight into how the previous generation of corps and divisions prepared and executed such a complex task. After analyzing how these units were able to cross the numerous waterways in Europe, the present Army should consider reassessing its doctrine, training, and organization and equipment to prepare its units for future deliberate wet gap crossings.

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ABSTRACT

BEYOND THE GAP: A HISTORICAL PERSPECTIVE ON WORLD WAR II RIVER CROSSINGS, by Major John Ordonio, 51 pages.

Crossing a river against a defending enemy force is a difficult and complex task for any army. History has shown that preparation is necessary to avoid disasters during this type of operation. In 2003, the Third Infantry Division crossed the Euphrates River because it was prepared for this task and possessed the necessary equipment. Since then, no other divisions or corps has executed river crossing operations.

While the United States Army focused on counterinsurgency operations during the last twelve years, it underwent significant changes to adapt to meet the adversities on the battlefield. It transformed its war-fighting organizations, trained its corps and divisions with computer simulations, and relegated field training to brigade and below units. In addition, its current doctrine now refers to river crossings as the deliberate wet gap crossing. Because of these changes, many questions arose as to the present corps and divisions' preparedness to do large-scale operations, to include its ability to plan, prepare, and execute the deliberate wet gap crossing. If called today, could these organizations conduct this complex operation? Examining river crossings in Europe during the Second World War was appropriate for insight into how the previous generation of corps and divisions prepared and executed such a complex task. After analyzing how these units were able to cross the numerous waterways in Europe, the present Army should consider reassessing its doctrine, training, and organization and equipment to prepare its units for future deliberate wet gap crossings.

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INTRODUCTION

It was a summer morning in 1944. As the sun rose and embraced the grassy farmland, a distant sound of rolling wheels and rumbling metal suddenly stopped as an army division approached a gushing river that blocked it. Shortly thereafter, dismounted reconnaissance forces emanated from this formation and slowly crept through the open fields searching for enemy presence near this obstacle. Overhead, friendly airplanes circled above, photographing potential crossing points. The enemy defenders, hidden on the other side, protected the far bank with a combination of machine guns, tanks, and artillery. As the division mustered its troops and bridge equipment for the assault crossing, bombers emerged below the clouds and dropped their explosive payloads on heavy bunkers while the artillery struck at hidden enemy armored vehicles with multiple fragmenting shells. As the sun began to set, the division covered its movement by firing white smoke rounds to obscure the enemy's view. While the engineers and the infantry troops hauled the inflatable boats and bridge pieces to the crossing sites, the enemy fired desperately through the thick cloud. Under cover, the infantry rowed across the river, leaped out of their assault boats, and took up hasty defensive positions on the far side. With the infantry in position, the engineers pieced together the puzzle of parts, and began emplacing the bridge across the gap. While the engineers worked, the rest of the division slowly made its way towards the embankments through a moonlit maze of roads and checkpoints. Other soldiers, tasked with controlling traffic, met the vehicles at the entrance of each bridge, inspected them, and informed the drivers to move slowly across the spans. By high noon the following day, 2,000 vehicles and 14,000 troops had crossed this barrier and were continuing to advance against the enemy's main force.[1]

[1] 80th Infantry Division, "Preparation for and crossing of the Moselle River 1-15 September 1944," http://www.80thdivision.com/WebArchives (accessed February 24, 2013).

Crossing a river, defended by an enemy force, is a difficult and complex task for any army organization. It involves many diverse activities, besides physically crossing it and synchronizing many units with different capabilities. One method to visualize the crossing process is to organize conceptually the battlefield into three related parts: the deep area, a close operations zone, and a rear or security area.[2] The activities that take place on the river as the force approaches the crossing area, and on the opposite side once the unit has arrived at its banks is the deep area. In this zone, the enemy force opposes the friendly advance, defends the water line, and provides artillery fire and logistics support for the defenders. It is here where the enemy awaits the crossing units in defensive positions.

As the unit approaches the river, the commander has options to affect his opponent and facilitate the actual crossing. Two of the most important tasks are conducting reconnaissance and attacking the enemy with indirect fires. The overall crossing force commander directs his units to conduct reconnaissance to discover information on the enemy and terrain in the crossing area.[3] Ground organizations, such as patrols and mounted cavalry scouts, probe the hostile defenses. He sends aircraft to photograph and observe the defender as well as identifying potential places to cross the river. They seek good crossing points along the river appropriate for launching assault

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This vignette described the 80th Infantry Division's crossing of the Moselle River in September 1944.

[2]United States Army, Army Doctrine Publication 3-0, *Unified Land Operations* (Washington D.C.: Headquarters, Department of the Army, 2011), 12. Deep operations are friendly actions that disrupt uncommitted enemy forces and long-range weapon systems. Close operations consist of friendly's immediate effects on the enemy in direct contact. Security operations include the actions to retain freedom of action and ensure uninterrupted support or sustainment of all other operations. Although the definition of close operation involves early and accurate warning of enemy operations, for describing the river crossing operations, the reconnaissance effort was considered in deep operations in order to distinguish actions that occurred forward and in the rear of the division's operation.

[3]United States Army, Army Doctrine Reference Publication 1-02, *Operational Terms and Military Symbols* (Washington D.C.: Headquarters, Department of the Army, 2012), 1-31.

boats and rafts and then building the bridges. These areas require good routes to and from the crossing site and terrain that allows for covering fire and defending the enclave on the far side. Detailed reconnaissance allows the crossing force to attack enemy positions, headquarters, and supply facilities with indirect fires and aircraft. Indirect fires are those weapons, such as howitzers and mortars, which do not rely on a direct line of sight to aim and fire. Aircraft can find and destroy enemy positions. In addition to the fighters and bombers available in World War II, modern commanders can also utilize attack helicopters and remotely piloted aircraft. Thus, reconnaissance and indirect fires are important in the deep area because they set the conditions for the operation.

It is during close operations that the actual crossing takes place, and it includes all activities conducted on the river. Most important during this phase is protecting the precious crossing equipment. These boats, rafts, and bridges are a limited resource, difficult to replace, and the defender's most important target. Therefore, the first action of the crossing force is to establish a bridgehead on the far side of the river. A bridgehead is the area, on the enemy side, that protects the crossing points.[4] It must be free of enemy presence and be large enough to position anti-aircraft and anti-armor units to contribute to the crossing's defense, and provide sufficient space to organize the vehicles as they cross from the friendly side. The bridgehead commander has many tasks during this phase. In the beginning, he organizes the ground troops and engineers into assault forces. These forces traverse the river in boats, defeat the defending enemy, and establish defensive positions. Their primary task is to defend the engineers who are directing the actual crossing. The engineers usually begin the process by moving boats to the river and building rafts. They start to ferry combat vehicles and more troops across to provide more

[4]United States War Department, Field Manual 100-5, *Operations,* 1941 (Washington D.C: Government Printing Office, 1941), 194.

support to the infantry, who continues to attack and clear the area of enemy forces. While the infantry is expanding the bridgehead, engineers and military police set up the routes and checkpoints on both sides of the river to guide the division during the crossing. Once the assault force has secured the bridgehead, engineers begin to build the bridges. When they complete this task, units move towards the river, and pause at certain checkpoints. From here, engineers organized units into crossing groups to regulate the flow of traffic across the bridge, and to ensure they do not congregate on the far side and become a target for enemy aircraft or artillery. When the entire division is on the opposite side, commanders ensure that all units reorganized into their tactical arrays, refueled, and ready to continue the mission.

While lead combat units are across and back into the fight, the senior commander still have work to do in the space behind the crossing sites, called the rear or security zone. It is here where frontline units assemble additional personnel and equipment to move across the river, and evacuate casualties and battle damaged vehicles to staging areas. This is the location for the headquarters and key support infrastructures: supply depots, hospitals, and bridges and roads that link this area to the frontline units or lines of communication. Any enemy activity within this area could drastically influence the troops' ability to fight; therefore, the senior commander must protect it with the appropriate fighting forces while balancing the requirements of the frontline units. Meanwhile, engineers are also at work replacing the tactical bridges with permanent ones, and maintaining and repairing the roads and supply routes to the crossing sites. Considering all these activities within the rear area, this further adds to the complexities of river crossing operations and is an element staffs often ignore during the planning process.

During the Second World War, the United States Army, especially in northwestern Europe, became adept at crossing water barriers. Rivers of all sizes flow across the French, Belgian, Dutch, and German landscape. Major rivers, such as the Meuse, Seine, Loire, Moselle, and Rhine are easily defended and difficult to assault. With the current military in transition, it is

appropriate to look to these previous examples for insights into how the previous generation of corps and division commanders performed these missions. The XII Corps' crossing of the Moselle River in September 1944 is a good example of river crossing operations. On September 4, 1944, Lieutenant General George S. Patton, the Third Army commander, ordered Major General Manton S. Eddy's XII Corps to secure a bridgehead east of the Moselle River, and then seize Nancy.[5] Eddy had three subordinate divisions: the 80th Infantry Division, the 35th Infantry Division, and the 4th Armored Division. Opposing the corps was the battle-tested 3rd Panzer Grenadier Division defending near Pont-a-Mousson, and the inexperienced 92nd Luftwaffe Field Regiment defending the areas near Dieulouard and Nancy.[6] In between the Americans and the Germans lay the fast flowing Moselle River that averaged 300 feet in width and seven feet in depth.[7]

[5]Third U.S. Army, "After Action Report Third U.S. Army, 1 August 1944 to 9 May 1943, Vol. 1: The Operations," Archives, Combined Arms Research Library, Fort Leavenworth, Kansas, 64.

[6]Robert Toguchi, "The Evolution of United States Army River Crossing Doctrine and Equipment, 1918-1945," Ph. D diss, Duke University, 251-252. Major General Hans Hecker commanded the 3rd Panzer Grenadier Division, and his unit was in Italy before defending the Moselle River. The 92nd Luftwaffe Field Regiment was a training unit that had a mixture of anti-air craft gunners, and replacements.

[7]Ibid., 227.

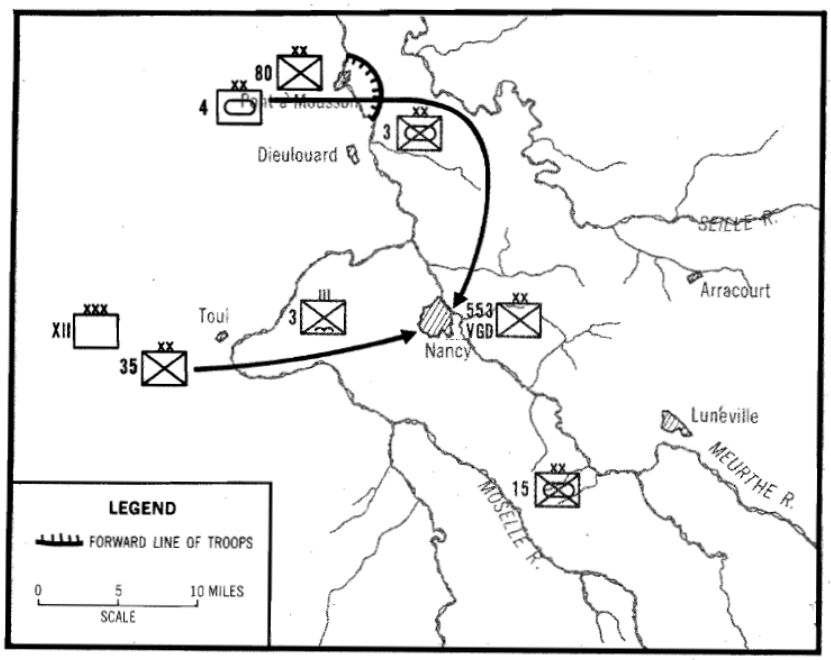

Figure 1. XII Corps: Original plan, single envelopment of Nancy. *Source*: Christopher R. Gabel, The Lorraine Campaign: An Overview, September-December 1944 (Fort Leavenworth, KS: Combat Studies Institute, US Army Command and General Staff College, 1985), Map 5.

Initially, the corps commander planned for a single envelopment of Nancy (see figure 1). The 4th Armored Division was to attack through a bridgehead secured by the 80th Infantry Division at Pont-a-Mousson and then attack Nancy from the east, while the 35th Infantry Division was to secure a bridgehead at Toul and attack the city from the west. The corps assumed that the German's defenses were very light, and the bridges were intact. However, during execution, these assumptions led to a near catastrophe. The corps started its mission in the daylight with minimum artillery and bomber support to the 80th Infantry Division while the experienced panzer division destroyed all the bridges and was well entrenched in solid defensive lines.[8] The Germans overwhelmed the Americans with heavy firepower and repulsed their advanced. The American division would try again to cross the river later that night, but they met the same fate as its first

[8]80th Infantry Division, "80th Infantry Division AAR: Preparation for and crossing of the Moselle River 1-15 September 1944," http://www.80thdivision.com/WebArchives/ (accessed February 24, 2013).

attempt. On a third and final attempt, the panzer division again inflicted heavy casualties on the 80th Infantry Division with tremendous firepower and drove them away. After the Germans repulsed the division three times, the corps commander withdrew it from Pont-a-Mousson and devised a new approach to seize Nancy. [9]

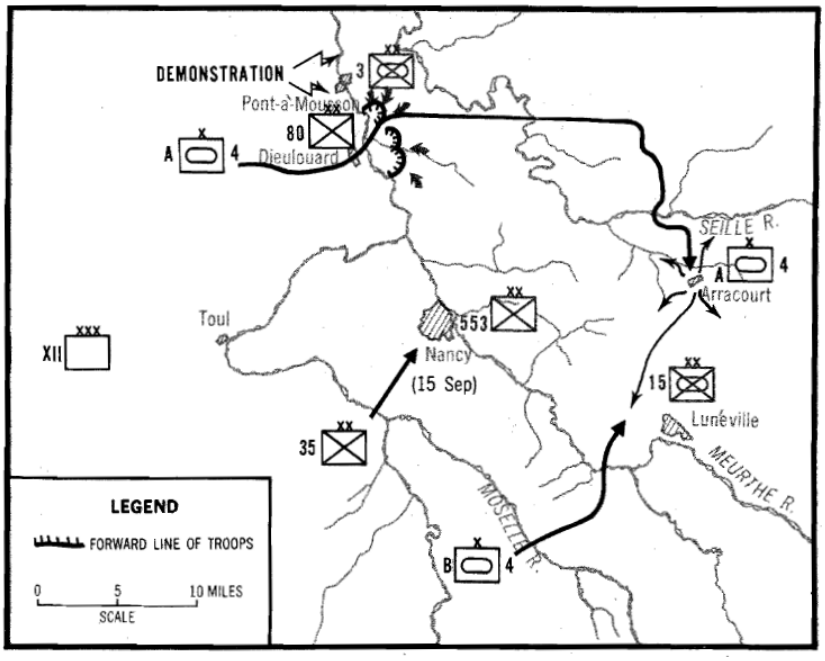

Figure 2. XII Corps: Revised plan, double envelopment of Nancy. *Source:* Christopher R. Gabel, *The Lorraine Campaign: An Overview, September-December 1944* (Fort Leavenworth, KS: Combat Studies Institute, US Army Command and General Staff College, 1985), Map 6.

Eddy's revised plan called for a double envelopment of Nancy with his three divisions crossing the Moselle across a wide front (see figure 2). In the northern sector, the 80th Infantry Division was to establish a bridgehead south of Pont-a-Mousson at Dieulouard while Combat Command A of the 4th Armored Division was to attack through the bridgehead towards Arracourt and eliminate the Germans escaping from Nancy. In the center, the 35th Infantry Division was to

[9]Christopher R. Gabel, *The Lorraine Campaign, An Overview, September-December 1944* (Fort Leavenworth, KS: Combat Studies Institute, US Army Command and General Staff College, 1985), 14-15.

set up a bridgehead near Nancy and keep the enemy from reinforcing the defense lines in the north and south. In the southern sector, Combat Command B of the 4th Armored Division was to emplace its bridgehead near Bayon, then attack towards Luneville to link up with its sister unit and destroy the Germans retreating from Nancy.[10]

The corps successfully executed this plan and Germans' defenses were not able to stop the assaulting Americans. Instead, all three divisions established their respective bridgeheads with ease. Both Combat Commands crossed the Moselle River and encircled Nancy, which led to the Germans to surrender to the nearest American unit, the 35th Infantry Division. Later, the Third Army established its headquarters in Nancy and directed the XII Corps to assume responsibility for protecting this vital area. It enabled the corps' mission by providing additional units. One of those units was the 1303rd General Service Engineer Regiment. These engineers improved and protected the bridges, improved the road networks around Nancy, and provided construction support for Third Army headquarters.[11] The XII Corps and its subordinate divisions overcame the challenges of river crossings. It learned from its failed attempts and quickly adapted its approach in following crossings. Ultimately, the corps crossed the Moselle River and other ones that followed it.

River crossing operations were nothing new and neither a novel feat; however, its complexities had proved formidable and at times nearly fatal for any army. Throughout history, armies have encountered the challenges of crossing rivers that blocked its advance. Even the well-known Prussian military theorist, Carl von Clausewitz, commented on the challenges that

[10]Hugh Cole, *The Lorraine Campaign* (Washington D.C.: Government Printing Office, 1950), 57-116.

[11]Casey Devikis, "The Eager Beaver Regiment, The Regimental History of the 1303rd Engineers Regiment," Unit History, (1952), 213.

rivers presented to an army.[12] He suggested that river obstacles were significant factors that disrupted and hindered an army in the offense.[13] This remark recognized what every army would experience when crossing a river: high casualties, reduced momentum in the attack, and vulnerable to enemy defenses. These conditions were almost unavoidable since armies operated in almost every area with rivers of various sizes and widths. Because of this, an army must always be prepared mentally and physically to endure the adversities of this kind of operation.

Throughout its history, from the Civil War to Operation Iraqi Freedom, the United States Army was doctrinally, materially, and organizationally prepared to confront the challenges of river crossing; however, this may not be the case today because of recent changes. During the last twelve years of counterinsurgency operations, the United States Army adapted to meet the adversities on the battlefield. It transformed its primary tactical formation from a division to a brigade. It trained its large unit organizations with computer simulations that replicated the frictions of combat, and relegated field training to brigade and below units in efforts to optimize resources.[14] Because of these changes, it begged many questions on its ability to conduct large-scale operations, including its ability to plan, prepare, and execute river crossings.[15] Since the United States Army had not done this task since 2003, were these changes suitable to prepare for the next river crossing?[16] Most importantly, if called today, could the current corps and divisions conduct this task?

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[12]Carl von Clausewitz, *On War*, trans. and ed. Michael Howard and Peter Paret (Princeton, New Jersey: Princeton University Press, 1976), 532-534.

[13]Ibid.,533. Carl von Clausewitz stated, "A river is a substantial factor, for it always weaken and dislocates the offensive."

[14]United States Army, Army Regulation 350-28, *Army Exercises* (Washington D.C.: Headquarters, Department of the Army, 1997), 4.

[15]Michael Tucker, "Maintaining the Combat Edge," *Military Review* Vol. XCI No.3 (2011): 8.

[16]11th Engineer Battalion, "Operation Iraqi Freedom, 11th Engineer Battalion, 2003." Unit

There are many reasons to explain the Army's success in bounding across the network of European rivers and canals. One explanation could be that it was successful because the Germans were already weak by the time the Allies entered France, and therefore could not effectively overwhelm and stop them. Another explanation could be that the Allies' fast pursuit of the Germans across France did not allow them the time to establish and improve their defenses. A third possible explanation could be that the United States Army mimicked the methods of other Allies, and used them to cross the waterways. These possibilities does not match the historical evidence, the United States Army in World War II was able to conduct river crossings because of its doctrine, training, and organization and equipment.

History (2003), 29. On April 3, 2003, the 3rd Infantry Division conducted a deliberate wet gap crossing over the Euphrates River.

DOCTRINE

Upon receiving the Third Army's order to cross the Moselle, the XII Corps Engineer, Colonel C.E. Doughtery, pondered methods to accomplish this mission. As he walked around the headquarters, he pulled three important books off the shelf, which would refresh his memory on planning and executing river crossing operations: Field Manual 100-5, *Operations*, Field Manual 5-5, *Engineer Field Manual Troops and Operations*, and Field Manual 5-6, *Operations of Engineer Units.*[17] He then gathered his staff, analyzed the photographs of the crossing areas, and began to figure out the bridge requirements and engineer units needed to support the three divisions. After hours of deliberating, his staff wrote an engineer paragraph for the corps order and an annex to provide direction for the subordinate engineer units.[18] While the entire corps received the mission, the three division headquarters referenced the same books and wrote an order for their subordinates.[19]

Colonel Doughtery and the entire corps had access to common yet vital books to guide their planning and execution for this mission. These books or field manuals standardized procedures for all the units and it provided a common framework to conduct operations in a similar manner. For example, each unit's field orders followed the same format, which allowed them to organize the pertinent information for easy reference by their subordinates. Additionally, during the crossing of the Moselle, both the 80th Infantry Division and the 35th Infantry Division

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[17]XII Corps, "Staff Operational Procedures, 12 August 1944 – 8 May 1945, Engineer Section, Standing Operating Procedure," Gilbert R. Cook Papers, Box 9, Dwight D. Eisenhower Presidential Library, Abilene, Kansas, 110. The document stated that field manuals and technical manuals were required in the admin section of the engineer section. It also outlined the roles and responsibilities for the personnel that worked in the engineer section.

[18]Ibid., 113.

[19]4th Armored Division, "Combat History, 4th Armored Division 17 July 1944 – 9 May 1945." 4th Armored Division, Box 78, Dwight D. Eisenhower Presidential Library, Abilene, Kansas. The division received the order from XII Corps and ordered Combat Command B to force a crossing at Bayon and Bainville.

sent their assault forces in boats first, and then they built the bridges. [20] These divisions similarly executed these tasks because they referenced the same methods in the field manuals. These standard procedures were an important aspect of military doctrine.

Military doctrine could mean different things. Some said that it reflected the experiences and theories that work best in war, and others suggested that it merely described war. [21] While there were many interpretations, military doctrine was a common framework for units to organize, train, and equip; and, its purpose was to guide the troops' actions in combat.[22] The United States Army developed its doctrine through time, and its ideas came from the collective experience of units and individuals from previous wars. [23] In World War II, the field manuals were the primary literature on doctrine, which provided units with a standard yet effective tactical procedure to conduct many types of operations like river crossings. Therefore, the United States Army was more effective in performing this complex operation because its doctrine evolved through the collective experiences from previous wars, which matured to effective methods by 1943.

The United States Army's experience in river crossing operations began during the Civil War. While most of this war's crossings occurred over skinny rivers, like the 1862 Rappahannock River crossing during the Battle of Fredericksburg, the Union Army's operations at the James

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[20]XII Corps, "Report of Operations: 31 August 1944 – 30 September 1944", Gilbert R. Cook Papers, Box 9, Dwight D. Eisenhower Presidential Library, Abilene, Kansas.

[21]John H. Cushman, "The CGSC Approach to Writing Doctrinal Literature," *Combined Arms Center and Fort Leavenworth Pamphlet Number* 1, 18 September 1973, 4; Walter E. Kretchik, *U.S. Army Doctrine: From the American Revolution to the War on Terror* (Lawrence, Kansas: University Press of Kanas, 2011), 5.

[22]Kretchik, 2.

[23]United States Army, *Dictionary of the United States Army Terms* (Washington D.C.: Government Printing Office, 1950), 78. This source defined doctrine as "the compilation of principles and polices, applicable to a subject, which have been developed through experience or by theory, that represent the best available to thought, and indicate and guide but does not bind in practice."

River in Virginia on June 1864 was significant because it required a commander to consider the risks of operating across a wider span.[24] General Ulysses S. Grant needed to cross this river, and then sever the lines of communication at Petersburg to weaken his adversaries in Richmond; but, the river's length of 2,100 feet concerned the general because the Confederates would be able to quickly exit their defensive positions at Petersburg and attack his forces while split between the banks. [25] To prevent this disaster, General Grant's methodical approach mitigated the risks. First, he ordered the Army of the Potomac to bypass the enemy near Richmond, and then wait until nightfall to cross at Weyanoke Point.[26] He positioned Union ships near the crossing area to prevent Confederate torpedo boats from disrupting the crossing.[27] Then, he coordinated with General Henry Haleck, Army Chief of Staff, to position plenty of pontoon bridge equipment along the Union's routes towards the river.[28] Last, he deceived the Confederates near Petersburg to stay entrenched by having the 18th Corps to conduct a false crossing twenty miles north of Weyanoke Point.[29] By the evening of June 15, 1864, the engineers built the pontoon bridges, and then the Union Army crossed the James and began its siege at Petersburg.[30]

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[24]National Park Service, "Battle of Fredericksburg History: The River Crossing," http://www.nps.gov/frsp/historyculture/fburg-hist-crossing.htm (accessed February 24, 2013).

[25]Stephen R. Riese, "The American Civil War's Effect on US River Crossing Doctrine," *Military Review*, September-October 1996, Volume LXXXVI, No 5 (1996): 97; Brian Holden Reid, "Another Look at Grant's Crossing of the James, 1864", *Civil War History*, Volume 39, Number 4, December 1993 (Kent, Ohio: Kent State University Press, 1993), 298-300.

[26]Mary Drake McFeely and William S. McFeely, *Ulysses S. Grant: Memoirs and Selected Letters, Personal Memoirs of U.S. Grant, Selected Letters 1839-1865*, ed. John Y. Simon (Carbondale, Illinois: Southern Illinois University Press, 1990), 593.

[27]Reid, 306.

[28]Ibid., 299.

[29]Ibid., 302. General Grant achieved his desired intent to deceive the Confederate Army into believing the Union Army was conducting a direct attack on General P.T. Beauregard position.

[30]Ibid., 306.

While the Union Army masterfully crossed the James River, its guiding doctrine during this time was merely an instruction manual for the bridges. Captain John C. Duane's 1862 *Manual for Engineer Troops* was the doctrine that guided river crossing operations during the Civil War.[31] Surprisingly, this manual was a composite of other foreign army's doctrine.[32] Its only resemblance of a tactical procedure was its short definition of reconnaissance.[33] Despite these shortcomings, this endeavor in Virginia contained the same elements that we recognize in doctrine today: reconnaissance, deception, preposition of bridge equipment, and night crossings. These elements would appear during an American unit's operations in Europe during the Great War.

In World War I, the 5th Division crossed the Meuse River against a defending German infantry regiment during the Meuse-Argonne Campaign in France.[34] This was a unique experience for the United States Army because for the first time, its leadership led a river crossing during a large-scale conflict overseas.[35] In prior river crossings, the United States Army supported the French Army's operations.[36] When movement began on October 31, 1918, the division was untrained in river crossings; however, it was able to execute this mission despite a

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[31]Riese, 97.

[32]John C. Duane, *Manual for Engineer Troops*, 3rd ed. (New York: D. Van Nostrand, 1864), Preface; Office of the Chief of Engineers, *Engineer Field Manual, Part II. Professional Papers No. 29* (Washington D.C.: Government Printing Office, 1904), Preface.

[33]Riese, 100.

[34]Richard R. Stewart, *American Military History Volume II: The United States Army in a Global Era, 1917-2008*, 2nd ed. (Washington D.C: Center of Military History, 2010), 43; Harley Latson, "The Crossing of the Meuse River by the 5th Division (U.S.) in November 1918, with Particular Reference to Engineer Technique." Individual Research. (Fort Leavenworth, KS, 1933), 6.

[35]Toguchi, 37.

[36]Ibid.

multitude of challenges. [37] Once again, the five elements were evident. The division used reconnaissance to identify the defender's positions and started its crossing at night. [38] Its engineers transported a small force to the other side to defeat the enemy overlooking the banks.[39] This allowed the engineers to emplace the footbridges; however, the German massed its firepower within the crossing area, and repulsed the American's effort. After regrouping, the division was finally able to cross on November 6, 1918 when it overwhelmed and weakened the defenders with artillery. [40] Although the United States Army endured this event, the same kind of doctrine from the Civil War informed its actions in this war. [41]

The river crossing doctrine in World War I resembled another technical manual. *Engineer Field Manual 1904* and *Pontoon Manual 1917* varied little from its predecessor from the Civil War. Both these manuals described the construction and characteristics of the bridges with little reference to any tactical procedures. In fact, the doctrine remained unchanged because the bridging equipment was similar to those used in the previous war.[42] Interestingly, the United States Army's overall guiding doctrine in combat, The *Field Service Regulation 1914*, did not even mention river crossing as a tactical task.[43] This would change after the war as the United States Army reflected on its experiences. The five elements along with the contributions of the

[37]Latson, 2.

[38]Ibid., 9.

[39]Ibid., 11.

[40]Ibid., 16.

[41]Riese, 97.

[42]United States Army Corps of Engineers, Professional Papers of the Corps of Engineers U.S. Army No. 33: *Pontoon Manual*, 1917 (Washington D.C.: Government Printing Office, 1917), 10.

[43]Kretchlik, 124; United States War Department, *Field Service Regulations*, 1914 (Washington D.C.: Government Publication Office, 1914), 1-244.

engineers and artillery units during this war would be vital in reforming the doctrine of river crossings during the interwar period.

After World War I, the United States Army entered a period of military innovations that yielded drastic changes in its doctrine. The government authorized a small permanent regular army that would expand when required; however, this army's subordinate units had different tactical doctrines to train and grow its formation during a mobilization. [44]Although it was satisfied with these dissimilar doctrines, the United States Army saw a need to standardize its procedures to mobilize its force under a common framework.[45] In addition, it saw a need for this change in light of the advancement of military technology such as long-range artillery and tanks.[46] Thus, it mimicked the practices of other foreign armies and published an official doctrine that included standardized tactical procedures.[47] In 1922, the United States Army revised its primary tactical doctrine and released an updated *Field Service Regulations*. This publication articulated how the United States Army would train, organize, and fight in future wars; however, this manual applied only to large-unit organizations: army, corps, and divisions.[48] Each arms of service, such as engineers, were responsible for its own doctrine which had to comply with the standards in the *Field Service Regulations*.[49] Specific to river crossings, the United States Army Corps of

[44]Stewart, 55; Toguchi, 86.

[45]Kretchlik, 132.

[46]Toguchi, 86.

[47]Kretchlik, 132. In addition, the National Defense Act of 1920 required the War department to change the Army's organization. This requirement along with its experience in World War I led the War department to revise its doctrine.

[48]Ibid.

[49]Ibid., 110 and 143. Initially, the doctrine was published as field service regulations, which were a standalone publication that was complimented by other doctrines from the different branches. By 1939, the doctrine would be a collection of several publications called field manuals.

Engineers were responsible for developing a standard tactical procedure for this type of operation.[50]

This period of innovation and reflection generated the common framework on river crossing operations for the United States Army. The 1939 *Tentative Field Service Regulation,* Field Manual *100-5 Operations*, and the 1932 *Engineer Field Manual Volume I Engineer Troops* described the tactical and technical considerations for this type of operation.[51] Field Manual 100-5 was the capstone doctrine that provided a guide on the conduct of large scale combined arms operations. It officially included river crossings as a common task and described it as special operations; it was not exclusively an offensive or defensive operation because of its technical and tactical characteristics. The manual articulated that the objective of this task was to cross the river quickly and establish a bridgehead. To achieve this objective, it incorporated elements that were from experiences of previous wars. First, the doctrine emphasized ground and aerial reconnaissance as a major element; its purpose was to identify crossing points and enemy positions. Specific to the crossing points, reconnaissance involved engineers gaining information on the physical characteristics of the river, like bank conditions and velocities. Second, deception was a method to mitigate the inherent risk of the enemy massing its firepower at the crossing points. To achieve deception, the manual stated to conduct the river crossing across a wide front where one element conducted a feint or demonstration to divert the enemy's attention away from

[50]Toguchi, 88.

[51]United States War Department, *Field Service Regulations 1932* (Washington D.C: Government Printing Office, 1932); United States War Department, *Tentative Field Service Regulation,* Field Manual 100-5, *1939* (Washington D.C.: Government Printing Office, 1939); United States War Department, *Engineer Field Manual*, 1904 (Washington D.C.: Government Printing Office, 1904); United States War Department, *Engineer Field Manual*, 1932 (Washington D.C.: Government Printing Office, 1932). There were no differences in the description of river crossings in Field Service Regulation 1932 and Field Manual 100-5 1939. Additionally, the Engineer Field Manual of 1904 and 1932 both did not varied in their description of river crossings.

the main crossing point.[52] Third, river crossing should start during the night. Similar to deception, crossing during limited visibility protected the main crossing point while preserving the element of surprise. Last, the manual provided an organization for the assault force to secure the bridgehead. The assault force was composed of two teams: bridgehead and support. The bridgehead troops consisted of a combination of infantry soldiers, light artillery, and engineers, while the support troops composed of heavy artillery, combat aviation, and machine gunners. The support troops protected the bridgehead troops as they crossed by suppressing the enemy with artillery fire. With the bridgehead secured, engineers emplaced the bridges that allowed the rest of the units to cross. While Field Manual 100-5 presented a tactical procedure for large unit organizations, the 1932 *Engineer Field Manual* complimented this manual.[53]

The 1932 *Engineer Field Manuals Volume 1* reinforced the capstone doctrine with engineers' responsibilities to river crossings and the technical characteristics of the equipment. In reconnaissance, the manual informed engineer officers in selecting the appropriate crossing points with respect to the unit's crossing equipment.[54] For instance, it provided them the technical data, such as total length of bridge, desired river conditions, time to construct, for all crossing equipment, and the corresponding engineer unit responsible.[55] Additionally, the manual complimented the capstone doctrine's tactical procedure by describing the sequence of employing the crossing equipment. First, the engineers used pontoon boats to transport the bridgehead troops to the far side. Next, they emplaced light pontoon to cross combat vehicles after these troops secured the bridgehead. Third, engineers emplaced heavy pontoon bridges to cross armored

[52]Ibid.

[53]United States War Department, *Tentative Field Service Regulation, Field Manual 100-5 Operations, 1939*, ii, 207-212.

[54]United States War Department, *Engineer Field Manual Volume 1, 1932,* 213.

[55]United States War Department, *Engineer Field Manual Volume 1, 1932,* 322-323.

vehicles. Last, engineer replaced the pontoon bridges with fixed ones.[56] While this engineer doctrine complemented its capstone counterpart, the tactical procedures for river crossings would eventually become obsolete in light of the emerging mechanized warfare.[57] The German Army's 1940 campaign in Western Europe illustrated this nascent form of combat. The United States Army became aware and concerned about its upcoming opponent when then Captain Paul W. Thompson, a United States Army Engineer Officer and observer in Germany before the war, translated and wrote several articles on the German publications that detailed their conquest across Europe.[58] Specifically, his works analyzed German Army engineers in combat and river crossing operations.[59]

In May 1940, the Germans unleashed a high tempo offensive operation across France. Its methods to cross the Meuse River would ultimately lead to the decimation of the French Army. Field Marshal Guderian and Field Marshal Rommel orchestrated two most notable approaches in river crossing operations. Guderian' s corps crossed the Meuse near Sedan; his overall concept consisted of infantry divisions to lead and establish a bridgehead, while the panzer divisions stormed across the bridges to penetrate the shallow defensive lines of the French's 55th Division.[60] He started the mission with a relative disadvantage in ground artillery; to

[56]United States War Department, *Engineer Field Manual, Volume 1, 1932*, 214.

[57]Toguchi, 107.

[58]Blanch D. Coll, Jean E. Keith, Herbert H. Rosenthal, *The United States Army in World War II, The Technical Services, The Corps of Engineers: Troops and Equipment* (Washington, D.C.: Center of Military History, 1988), 19; Toguchi, 168.

[59]Paul Thompson, *Modern Battle* (New York: Penguin Books and Washington D.C.: Infantry Journal, 1942), 1-253; Paul Thompson, *Engineers in Battle* (Harrisburg: The Military Service Publishing Company, 1942), 1-108.

[60]Karl-Heinz Frieser, *The Blitzkrieg Legend: The 1940 Campaign in the West* (Annapolis, Maryland; Naval Institute Press, 2005), 157.

compensate, he called for a massive aerial bombardment by the Luftwaffe. [61] Its attacks in the deep area shocked and nearly crippled the French.[62] Even more stunning was the manner that Guderian's engineers used its equipment to cross personnel and vehicles. Thompson noted that while the Luftwaffe shaped the deep area, the engineers took advantage of this permissive moment.[63] They used pneumatic boats to transport the assault force to the other side. As the troops secured the far banks, the engineers converted these boats to raft armored vehicles to the assault force. While they ferried vehicles, the engineers simultaneously built vehicle bridges from the same type of pneumatic boats used earlier.[64] Although the engineers' actions were unique, it took twelve hours before the first panzer units to cross because damaged vehicles littered the routes to the crossing area. [65] Regardless, the deep attacks were essential in allowing the engineers to use different ways simultaneously to cross the force, while preventing the French from organizing a meaningful counterattack.

Meanwhile, south of Sedan, Field Marshal Rommel's 7th Panzer Division crossed the Meuse at Dinant with a different approach than Guderian. Rommel's general concept called for a combined arms assault force in establishing the bridgehead. While he had less Luftwaffe support, Rommel had enough ground artillery to attack two French divisions. [66] Much like at Sedan, attacks in the deep area created a permissive space for Rommel's engineers; they were able to use different ways to cross this obstacle. One significant difference from Guderian's approach was that Rommel held his assault force on the far banks while the engineers ferried panzers to their

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[61]Ibid., 53.

[62]Ibid., 159.

[63]Thompson, *Engineers in Battle*, 18.

[64]Frieser, 174.

[65]Ibid.

[66]Ibid., 233.

positions.[67] Once combined, the panzer-assault team quickly dispatched the French and secured a bridgehead. Overall, the German Army's actions at the Meuse deeply concerned the United States Army because the level of detail in its doctrine allowed these commanders the tactical flexibility to combine various means to conduct river crossings.[68]

When comparing the doctrines of these two armies, it was no wonder there were great concerns. On one hand, the American's 1939 Field Manual 100-5 *Operations* described river crossing operations in general terms in ten pages while the German's capstone doctrine, *Truppenfuhrang*, provided a descriptive procedure in five pages.[69] As evident with Guderian and Rommel's actions at the Meuse, the German's river crossing doctrine combined with effective engineer equipment enabled them the flexibility to use different combinations of units in a form of warfare that required a high up-tempo offense with armored vehicles. As war with the Germans became eminent, the United States Army reevaluated its capstone manual and took heed of its opponent's actions in France. It not only changed its organization, but it revised its field manuals to reflect the example of the German Army.[70] In 1941, as the United States prepared for war, it released a revised Field Manual 100-5, *Operations,* and Field Manual 5-5, *Engineer Troops and Operations.*

The 1941 Field Manual 100-5, *Operations* was similar to the German's 1933 *Truppenfuhrang*, and it was unique in comparison to previous field manuals because it detailed the tactical procedures required to execute large-unit operations.[71] Specifically for river crossings,

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[67]Ibid.

[68]Call et al., 22.

[69]German Army, Truppenfuhrung, 1933, Archives, Combined Army Research Library, Fort Leavenworth, Kansas, 108-112.

[70]Kretchik, 148.

[71]United States War Department, Field Manual 100-5, *Operations,* 1941, 195 and 197. Deception should be conducted to protect the main crossing points by conducting a non-decisive

this capstone doctrine detailed the sequence of actions for this task much like its German counterpart.[72] First, it mentioned that the crossing started with the close air support and artillery fires while the engineer and the infantry assault force moved from the rear area to the final assembly area.[73] Next, the engineer with the assault boats led this infantry unit to the designated crossing points. The assault force crossed the river and secured the bridgehead, which consisted of three objectives. The first objective was the assault force to eliminate the direct and small arms fire to allow the construction of the footbridge and the ferrying of infantry vehicles.[74] The second objective was to achieve local air supremacy and eliminate ground observed artillery fire or light artillery fire that could affect the bridge construction.[75] Then, the division commander ordered the construction of the pontoon bridges. The third objective was to eliminate all artillery fires to allow the rest of the units to cross.[76] While this manual demonstrated improvement in the detail of the tactical procedures, the complimentary engineer doctrine improved in informing the engineer's responsibilities in river crossing.

The 1941 Field Manual 5-5 provided a developed and detailed engineer procedure to compliment the tactical procedure in the capstone doctrine. In reconnaissance, the manual informed engineers on the technical and tactical characteristics of the bivouac area, final assembly area, and crossing points.[77] The manual explained the order and movement of the

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attack (or feint) or a showing force without attacking (or demonstration).

[72]German Army, Truppenfuhrung, 111-112.

[73]Ibid., 198. The final assembly areas must be large enough for the engineer's assault boats, footbridge, and other crossing means while maintaining concealment from air and ground observations. From this position, only the covering force and reconnaissance units crossed the river.

[74]Ibid., 193.

[75]Ibid., 194.

[76]Ibid., 199.

[77]United States War Department, Field Manual 5-5, *Engineer Field Manual, Engineer*

crossing equipment from the rear area to the river line during execution. The division engineers prepositioned with the assault boats, infantry support rafts, and the footbridges at the final assembly area, while the pontoon bridge units transported its heavy and light bridges from the bivouac area directly to the crossing point to meet their division counterparts. Although both the corps and division engineers worked together to construct these bridges, the manual assigned the responsibility to the corps and army engineers to maintain the bridges after the division completed its crossing. The designated corps or army engineers deconstructed these float bridges and replaced them with fixed ones to allow the division to prepare for the next crossing. While there were improvements in the procedures, the engineer manual had flaws. It lacked a combined arms approach because it provided a guide for engineers during a river crossing but it did not articulate how they would integrate with the ground troops. The United States Army addressed this issue after learning from its experiences in the early times of World War II. It revised the 1941 engineer manual with an improved one that would better articulate river crossing as a combined arms operation.[78]

The United States Army forged in combat the 1943 Field Manual 5-6, *Operations of Engineer Units.* It was a dramatic improvement for river crossing operations because it better informed the engineers on integrating with their infantry and armor counterparts, and it provided essential information for staff officers to inform the division or corps commander. It did this by articulating the sequence of actions between the infantry, the engineers, and the crossing

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Troops and Operations, 1941. (Washington D.C: Government Printing Office, 1941). For each of these areas, the manual described the space requirements for the equipment and the terrain considerations to protect the area from the enemy. It further delineated the crossing points as an initial collection point and launch areas to describe the staging of the equipment.

[78]Toguchi, 207. The author argued that one of the failure of the Rapido River Crossing was the 1941 field manuals did not provide the necessary detail in tactical procedures to prepare the unit for this operation.

equipment.[79] This is evident in the manuals emphasis of rehearsals between the engineers and infantry where this provided an opportunity to focus on loading the boats during the assault phase. [80] In addition, it provided the division engineer with general planning principals.[81] These principals enable the engineer to inform the division commander on support to crossing operations. In all, the 1943 Field Manual 5-6 demonstrated how engineers integrated as part of the combined arms team outlined in the 1941 Field Manual 100-5.

The United States Army's experiences from previous wars shaped a doctrine by 1941 that enabled its units to plan and execute river crossings under a common framework, and by 1943, it created an even more solid and developed manual while in combat. The maturation of these doctrines resonated more critical elements than the original five from the Civil War. Reconnaissance, deception, and aerial bombardment were important elements in shaping the conditions while conducting the crossing at night was essential to maintain surprise and

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[79]United States War Department, Field Manual 5-6, *Engineer Field Manual, Operations of Engineer Units*, 1943 (Washington D.C., Government Printing Office, 1943), 92.

[80]Ibid., 91.

[81]United States War Department, Field Manual 5-6, *Engineer Field Manual, Operations of Engineer Units*, 1943, 89 and 117. General planning principals: 1) Economy of Force-Engineers were attached to the infantry as required during river crossing operation and the remainder remain under division control, 2) Engineer units attached to the division were under division control, 3) Consider fatigue and casualties and time to reorganize when assigning engineer units; in other words, assign one fresh engineer unit per major task 4) Unity of command must be maintained, 5) Plan for engineer to carry engineer work in rear areas during crossing operations and to assist in the advance on the far side, and 6) Plan for a reserve of men and equipment; a reserve was equal to 1/3 of the minimum requirements of the proposed plan. The manual provided planning factors on the frontage for the infantry units. The frontage value for each size of formation provided engineers information to consider both crossing equipment and the crossing elements in the selection crossing points. In addition, to maintain the tactical unity of the division during the river crossing, the manual provided planning considerations for the engineers when associating the crossing units with the appropriate type of crossing equipment. For example, the assault boats transport rifle companies and artillery forward observer first then followed a second wave with their heavy weapons company, artillery, and battalion headquarters. The manual provided a graphic illustrating how the infantry units configured within the assault boat.

protecting the crossing points. Most valuable yet overlooked at times was that river crossings operations also included actions within the rear area. For instance, the role of the engineer was vital in this part because of their roles in maintaining and protecting the lines of communication. Additionally, the complimentary aspects between the capstone and engineer doctrines postulated that this type of operation was more than an engineer effort; it was a combined arms operation. Although the United States Army developed a battle-tested doctrine by 1943, the 1941 version would be essential in providing the direction for units training to conduct this complex operation and prepare it for combat against the Germans.

TRAINING

In a classroom in the mid-west, instructors led a discussion with military officers on the division's tactical methods described in Field Manual 100-5. Later in the evening, the instructors gave them a map and a corps order, and tasked them to develop a division order. The instructors graded the assignments and provided candid feedback to the students. In the dry deserts of the southwest, a commander led his tank company to practice moving and shooting against silhouetted enemy targets. His battalion commander observed this event and later gathered the company to discuss techniques and procedures for maneuvering. In the swampy and humid area of the south, a commander stood on a hilltop and observed one of his divisions and its three regiments clustered in open terrain and exposed near the river. The opponent's artillery observers saw this chaos and called for the cannons to fire. The observer also informed the umpire who then called their counterparts with the regiments. These umpires then scrambled to find each of the regimental commanders and informed them of the causalities each of their units had taken due to enemy artillery. Meanwhile, the general noted in his book "traffic control" and "discuss establishing a bridgehead."[82] Later in the evening, the general spoke to his division commanders and staff about the debacle at the river.

These examples represented the different ways in which the United States Army prepared for combat. It referred to this as training. Training improved individual and unit abilities to execute various combat tasks while doctrine provided the common framework to train. It categorized training in three areas: individual, unit, and combined arms.[83] Individual training

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[82]Major General Gilbert Cook's notes during the Tennessee Maneuvers of 1943, "O-5 Ten Maneuver, Feb 27 –March 1, 1944," Gilbert R. Cook Papers, Box 6, Dwight D. Eisenhower Presidential Library, Abilene, Kansas.

[83]Robert R. Palmer, Bell I. Wiley, William R Keast, *The United States Army in World War II, The Army Ground Forces, The Procurement and Trailing of Ground Combat Troops* (Washington D.C: Center of Military History, 1991), 442.

focused on soldier skills; an example was an officer receiving instruction and applying lessons to map problems in a classroom setting. Other examples included soldiers' firing their weapons at the qualification ranges, and new engineer soldiers taught to operate the assault boats. Ultimately, these individual skills contributed to the collective tasks required in unit and combined arms training. Second, a tank company practicing moving and shooting targets was an example of small unit training. This focused on collective skills from the platoon to the regimental level. The General Headquarters of the United States Army established a standard, guided by doctrine, to evaluate these small units.[84] It must meet the standards before moving to the combined arms training.[85] Last, a corps collectively training with its subordinate divisions was an example of combined arms training. This type of training focused on large unit organizations of divisions, corps, and armies; it also consisted of integrating various troops units, such as infantry, armor, aviation, artillery, and engineers, in conducting combined operations. Typically, the United States Army conducted this type of training over a large area, and it commonly referred to this as maneuver training. Major General Gilbert Cook, XII Corp Commander before Major General Eddy stated that the purpose of this large scale exercise was to "teach corps with divisions to play as a team and to kill efficiently." [86] This was where corps and divisions practiced river crossings in near combat conditions. Of these training categories, the United States Army in World War II was prepared to conduct this complex task because of large unit maneuver training and officer education at the Command and General Staff School in Fort Leavenworth, Kansas.

[84]Ibid., 443.

[85]Ibid.

[86]Major General Gilbert Cook's notes dated February 1, 1944, Gilbert R. Cook Papers, Box 6, Dwight D. Eisenhower Presidential Library, Abilene, Kansas. Major General Cook was the Commanding General for XII Corps from October 1943 to August 1944.

In 1939, the United States Army expected a war against Germany and prepared for another large-scale conflict overseas. General George C. Marshall tasked his chief of staff, Lieutenant General Lesley McNair, to develop a plan to prepare units for combat. By 1941, he announced a program to get ready four field armies through a series of training measures that build from the individual to the collective level. Before these armies participated in large unit exercises, subordinate organizations must train and certify first. It all started at the divisions where it managed individual and unit level training programs. One way it conducted individual training was organizing schools for commissioned and non-commission officers on various topics such as leadership, communication, and physical training. As soldier skills developed, divisions incrementally progressed into the unit level training program that focused on the platoon to the regimental level. To be certified, the superior echelons, corps or armies, tested each of these units against the standards established by the General Headquarters. For instance, infantry platoons and companies qualified on firing weapons as a collective, and then reorganized and took part in the field exercises that certified infantry battalions. Once this was complete, then the division could participate together in maneuver training, and then as part of larger scale exercise under a corps and ultimately as an army. In the army level exercises, it collectively participated in this event against others under the direct supervision of the General Headquarters. It was at these large-scale maneuvers where corps and divisions became proficient in combat tasks to include river crossings.[87]

The Louisiana Maneuvers of 1941 was one of these training events that physically and mentally prepared corps and divisions for the realities of dealing with these water obstacles in Europe. In September 1941, the Second Army and the Third Army fought against each other over

[87]Palmer et al, 443; Christopher Gabel, *The United States Army GHQ Maneuvers of 1941* (Washington D.C: Government Printing Office, 1991), 5.

a wide area that nearly resembled France and Germany; it encompassed most of western Louisiana and parts of eastern Texas. Most importantly, it was large enough with long and wide streams that allowed units to practice crossing operations.[88] While they trained in terrain similar to Europe, the General Headquarters managed the realism of warfare by replicating the combat experience. This organization served as the higher command center for the participating units as well as the overall exercise control. It prescribed the orders and guidance to the armies while it was responsible for the conduct of the maneuvers. One aspect of managing the exercise was applying the effects that would result in actual battle. This responsibility primarily fell to the umpires who were designated officers from the General Headquarters. They would accompany the units and adjudicated effects by assessing casualties and vehicle damages throughout the fight.[89] Training under this near realistic battlefield gave these units the opportunity to build confidence in applying the doctrinal procedures described in the field manuals.[90]

Even though doctrine told the units how to execute these combat tasks, maneuver training validated it. The Louisiana Maneuvers was essential in river crossing operations because this was one of the few times where units practiced the doctrine in near combat conditions. It would be here where the 1941 capstone and engineer doctrines, Field Manual 100-5 and Field Manual 5-5, were tested. The combination of these doctrines postulated that river crossings was a combined arms operations, and thus to prepare for it, it suggested that rehearsals needed to be conducted between the ground troops and the engineers. It was also a great opportunity for the engineers to

[88]Gabel, 5. It consisted of over 10,000 acres that extended as far north as Shreveport, south Lake Charles, east to Alexandria, and west to Nacogdoches, Texas. There were three large rivers within this training area: Red River, Calcasieu River, and Sabine River.

[89]Ibid., 46-47.

[90]United States War Department, Field Manual 100-5, *Operations*, 1941, preface; Major General Gilbert Cook's notes dated February 1, 1944, Gilbert R. Cook Papers, Box 6, Dwight D. Eisenhower Presidential Library, Abilene, Kansas.

provide practical instructions on the crossing equipment to the ground troops.[91] These rehearsals would be critical to preparing the participating units to execute crossing operations during the exercise in Louisiana.

Before the Second Army and Third Army conducted large-scale river crossings, the General Headquarters required the subordinate divisions' engineers to lead rehearsals and train their respective units on the execution of this combined arms task. It involved portions of the division that consisted of a one infantry battalion, one light artillery battery, tactical air units, a combat engineer battalion, and one light pontoon bridge company. [92] Although the engineers and ground troops trained on their equipment, this rehearsal was beneficial to them because it revealed that equipment proficiency did not necessary equate to combat efficiency. The engineers were very slow to transport then build the means for the ground troops. In addition, the ground troops and the engineers were not synchronized, which resulted in prolonging the crossing unnecessarily. The combination of these mishaps nearly equated to a day and half to cross a few elements of the division. Fortunately, these issues came out during the rehearsals and not during the actual execution. Although the entire division was not involved, this enabled the leaders to see these calamities and appreciate the time required to conduct this operation at its entirety. After the divisions completed the rehearsals, they moved on to the start of the army maneuvers.[93]

At the beginning of any operations, key activities shaped the conditions for the upcoming close fight. In Field Manual 100-5, reconnaissance and close air support were important activities that prepared the conditions for the actual crossing. Reconnaissance collected information on the

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[91]United States War Department, Field Manual 5-5, *Engineer Field Manual, Troops and Operations,* 1941, 249.

[92]Mason J. Young, "Crossing of the Red River," *The Military Engineer*, Volume XXXIV, No. 195 (January 1942): 31.

[93]Ibid.

enemy's position and the river's characteristics such as bank condition, depth, and velocity, while aerial units attacked the opponents to weaken them. Both these tasks took advantage of the standoff created by the equipment it used, thus the combination of these activities created the operational space for commanders by finding then attacking the enemy before he committed his most precious commodity to the river, the bridges. The Second Army's operations over the Red River demonstrated the usefulness of these two activities.[94]

When the General Headquarters tasked the Second Army to conduct a river crossing over the Red River and attack the Third Army, it shaped the deep area with a combination of ground and aerial reconnaissance units in conjunction with indirect fires. The Second Army started its mission with aerial reconnaissance while the corps and division ground reconnaissance identified potential crossing points. Afterwards, it conducted close air support and ground artillery to attack the Third Army in the deep area before sending its leading element, VII Corps, to cross the obstacle.[95]

After a successful attack in the deep area, the VII Corps prepared its subordinate units to cross and establish a bridgehead in accordance with doctrine. Both capstone and engineer manuals guided the corps and division staff officer on tasking and organizing engineer units for river crossings.[96] Divisions only have one engineer unit that does not have any bridges, and thus

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[94]United States War Department, Field Manual 100-5, *Operations*, 1941, 192-193.

[95]Gabel, 32. The Second Army used its air force in other missions to conduct close air support against the Third Army.

[96]United States War Department, Field Manual 5-5, *Engineer Field Manual, Troops and Operations,* 1941, 248. The manual stated that staff officers should consider the following when tasking and organizing engineer units: 1) Planning-procurement of troops and equip/recon, 2) Movement to assemble positions near the river line, 3) Movement from assemble position and crossing leading waves by assault boats, 4) Crossing by succeeding waves of assault boat, footbridge, individual pontoon ferry, and pontoon raft ferry, 5) Cross combat vehicles by pontoon raft ferry, 6) Construction of pontoon bridges, maintenance, and repair, and 7) Replacement of pontoon bridges.

most of its equipment came from engineer units pooled at the army.[97] The army engineer was overall responsible for assigning these non-divisional engineers units down to the corps and divisions.[98] Once at the division level, the engineer senior officer controlled and synchronized these units with the ground units for only the duration of the mission. Meaning, the non-divisional engineers would return under the control of the division after the completion of the crossing. When it crossed the water obstacle, the Second Army did practice this approach on tasking and synchronizing engineers units with the other combat troops.

While the VII Corps led the mission at the Red River, the Second Army retained control of the 35th Engineer Battalion's pontoon units until the corps reached the forward assembly areas. Once it received them, the corps assigned the pontoon units down to the division's combat engineer regiment. The pontoon units worked with the division's engineer regiment to ferry the infantry soldiers to the far side and to secure the bridgehead at three crossing areas: Campti, Montgomery, and Irma. In addition, this team together built heavy pontoon bridges and a reinforced pontoon bridge to cross the armored vehicles to the far side. At the end, the engineers took a total of forty-eight hours to complete the entire crossing using assault boats to ferry the infantry soldiers, two long heavy pontoon bridges at Campti and Irma, and one reinforced pontoon bridge at Montgomery.[99]

Although it may seem that river crossings operations end after the assaulting divisions reach the other side, there were activities that occurred in the rear area to sustain it as it continued

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[97]United States War Department, Field Manual 5-5, *Engineer Field Manual, Troops and Operations,* 1941, 44; Kent Greenfield, Robert R. Palmer, Bell Wiley, *The United States Army in World War II: The Army Ground Forces, The Organization of Ground Combat Troops* (Washington D.C.: Center of Military History, 1987), 11.

[98]United States War Department, Field Manual 5-5, *Engineer Field Manual, Troops and Operations,* 1941. 250.

[99]Young, 32.

beyond the gap. While Field Manual 5-5 stated that the army or corps controlled non-divisional engineer units, it also assigned these large organizations the responsibility to maintain the bridges and the road networks in the rear area. Armies or corps controlled the engineer general service regiments, which were the type of units that had the capability to improve the lines of communications. It repaired roads, maintained and secured bridges, and replaced tactical float bridges with fixed ones. Despite the doctrinal references, there was little historic evidence that the Second Army's did any actions in the rear area after it crossed the Red River, however, it did consider it. Lieutenant Colonel Mason Young, the VII Corps Engineer, indicated that planning of the river crossing needed to consider the relief of the corps and division engineers as soon the crossing were completed.[100] Further discussions by Colonel Jarvis Bain, Second Army Engineer, suggested that the plan should consider army or corps engineers to build these bridges within the division area after the majority of the ground units completed the crossing.[101] The Second Army's actions at the Red River demonstrated that the 1941 doctrine was executable under near battlefield conditions. While the exercise validated the doctrine, it prepared units for combat. Regardless, these units would not be able to execute river crossing operations without its staff officers having the knowledge and understanding to apply the doctrine to any given situation. Thus, their education would be vital.

Along the Kansas side of the Missouri River was, and still is, the home of the United States Army's institute for staff officers. The Command and General Staff School was one part of the educational institutions that provided schooling for officers. Before going here, officers started their education by meeting requirements before commissioning through completing West Point, Reserve Officer Training Corps, or Officer Candidate School. Then, as these officers

[100]Ibid., 33.

[101]Jarvis Bain, "Discussion on Mason Young's 'Crossing of the Red River,'" *The Military Engineer* Vol. XXXIV No. 195 (January 1942): 34.

progressed to the rank of second or first lieutenant, they attended a basic branch course. After several years of service and selection by their branch, these officers would further their education in the rank of captain at the advanced course. To attend the Command and General Staff School, again branch selected officers after several years of service and promotion to major. The education at this school was essential in preparing the United States Army officers for combat in World War II, and it was critical to educating these future staff officers on the doctrinal application of river crossings.[102]

The Command and General Staff School prepared its students with the intellectual rigor to combine the use of all arms, and command corps and divisions.[103] It did this through the applicatory method, which taught the students on how to apply doctrine to solve problems. It differed from other forms of education because it required the students to prepare for class by studying and reflecting vice rote memorization. [104] This method consisted of a series of lessons that went from understanding the doctrine to applying it in combat scenarios during map exercises. The doctrine was the primary reference for both the students and the instructors, and it provided the context of the prescribed lessons. Generally, the course started with classes and small group discussion where the students enhanced their understanding of the doctrine by engaging in conversations among each other and with the instructor. After this, the students applied what they learned to map problems. The map problems were group exercises where each student role-played a corps or division staff officer. It was during this where students had to think through the problems, then develop and justify their solutions.[105] Through the applicatory

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[102]Peter Schifferle, *America's School for War: Fort Leavenworth, Officer Education, and Victory in World War II* (Lawrence, Kansas: University Press of Kansas, 2010), 34.

[103]Ibid., 35.

[104]Ibid., 100.

[105]Philip Cockrell, "Brown Shoes and Mortar Boards: U.S. Army Officer Professional

method, students progressively enhanced their understanding of division and corps operations, more specifically, in river crossing operations.

The curriculum provided the students with a comprehensive understanding in river crossing operations by dedicating between ten to eighteen hours of a combination of classes, small group discussions, and map exercises.[106] In preparation for these classes, the officers and instructors primarily read Field Manual 100-5.[107] While officers participated in one-hour classes on corps and division engineers' roles and capabilities, they also received a one-hour class on river crossings and the equipment.[108] Following this was the divisional level map exercise where officers' role-played staff officers and given specific requirements that tested their understanding of river crossing doctrine. One such requirement concerned some of the activities in the deep area, in particular, reconnaissance and deception. Since doctrine emphasized that these actions were essential to preparing for a river crossing, students were required to produce a reconnaissance plan that integrated engineers and airplanes, and developed a deception plan.[109]

Education at the Command and General Staff School Fort Leavenworth, Kansas, *1919-1940."* Ph.D.diss. (University South Carolina, 1991), 289.

[106]Command and General Staff School, 1940, "1st Regular Class Schedule 1940-1941," Archives, Combined Arms Research Library, Fort Leavenworth, Kansas; Command and General Staff School, 1942, "11th General Staff School Schedule November 1942 to January 1943," Archives, Combined Arms Research Library, Fort Leavenworth, Kansas; Command and General Staff School, 1943, "15th General Staff College Schedule September 1943 to November 1943," Archives, Combined Arms Research Library, Fort Leavenworth, Kansas. 10-18 hours came from the total hours of each class and map exercise from each of the three schedules.

[107]Command and General Staff School, 1942, "Infantry Division Exercise Instruction Sheet," Tenth General Staff Course, Archives, Combined Arms Research Library, Fort Leavenworth, Kansas. Instruction sheet specified Field Manual 100-5 as the primary text.

[108]Command and General Staff School, 1942, "Stream Crossing Equipment Handout for Student," Seventh Special Course February-April, 1942, Archives, Combined Arms Research Library, Fort Leavenworth, Kansas. The instructors provided planning factors for each of these pieces of equipment to help the officers understand the time and space requirements for engineers during river crossing operations. This training also provided the students with a film presentation that demonstrated the capabilities of each the engineer bridge equipment.

[109]United States War Department, Field Manual 100-5, *Operations*, 1939, 207.

The instructors assessed the students' response against a prescribed solution that was doctrinally sound. For instance, with regard to a deception, the instructor's solution consisted of conducting the crossing over a wide front where a regiment conducted a demonstration or feint away from the main crossing point.[110] After the division exercise, the curriculum tested the students' mettle in crossing operations at a higher echelon organization.

In the corps exercise, the instructors organized the students in to two corps headquarters staff in a competitive map exercise. In one scenario, one corps was to attack while the other defended.[111] Specifically for river crossings, the attacking corps planned to cross the river while the defending corps planned to opposed and repulse it.[112] In this exercise, officers not only plan to conduct a river crossing but they met adverse conditions during the execution if the plan was not doctrinally and tactically sound. Umpires assessed both plans based on its doctrinal application and then adjudicated the battlefield effects based on its tactical application. The umpires revealed the results of the adjudication, and then each corps staff readjusted their plan. The value of this exercise for river crossings was that officers adapted against a live opposing force and the uncertain conditions they may face on the battlefield.

The combination of individual, unit, and combined arms training prepared the United States Army to conduct river crossings in World War II. Its doctrine provided a viable tactical method to conduct this complex task and they tested and validated this during training. During large-scale maneuvers, units were able to train this task as a combined arms team against a live

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[110]Command and General Staff School, 1939, Instructor Notes, "Division Attack of a River Line, Map Exercise," Regular Course 1939-1940 G-1 Vol. 8, Archives, Combined Arms Research Library, Fort Leavenworth, Kansas, 358.

[111]Command and General Staff School, 1939, Instructor Notes, "Corps Attack and Defense of a River Line," Regular Course 1939-1940 G-1 Vol. 9, Archives, Combined Arms Research Library, Fort Leavenworth, Kansas.

[112]Ibid.

opponent on terrain similar to Europe. It was here where units built confidence on the doctrine and equipment by using them on an actual river under the stresses of the battlefield conditions. Meanwhile, the officer education at the Command and General Staff School used the application method that developed knowledgeable staff officers on river crossing operations. The division and corps exercises proved valuable to these officers because it challenged them to think through all possibilities in conducting this complex task. This school's approach to educating officers along with the maneuver training's live venue produced an army capable to effectively organize and equip for crossing operations during World War II.

ORGANIZATION AND EQUIPMENT

The XII Corps could not cross the Moselle without the supporting units from the Third Army. Before they started its operations across France, the Third Army attached various types of specialized units to the corps, which included units such as an engineer group headquarters, heavy pontoon battalions, light pontoon companies, and a mixture of artillery and tank units.[113] Then, the XII Corps prioritized and resourced these units to the crossing divisions first. For instance, it attached the 557th Heavy Pontoon Battalion and additional corps artillery units to the 80th Infantry Division. In addition, it coordinated with the Third Army for support from the XIX Tactical Air Command to provide the division with aerial reconnaissance and bombardment against German defenses along the river. Once they secured Nancy, the Third Army provided the corps with another set of particular units to protect and improve the rear area. For example, it gave the corps anti-air and chemical (smoke generating) units to protect this area from enemy air attacks.[114] Another specialized unit was the general service engineer regiment, which gave the corps the means to improve the routes, protect the bridges, and conduct other construction missions. While corps and divisions were the primary large unit organizations that planned and executed river crossings, they were not authorized the supporting units necessary to conduct this operation, and therefore were heavily reliant on the armies to provide them with the means.[115]

The division was the basic large unit tactical organization for the United States Army. Initially, the infantry division started as a square configuration because it had four regiments. This changed after the 1940 German's campaign across France and the Louisiana Maneuvers of 1941.

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[113]XII Corps, "Report of Operations 31 August 44 to 30 September 44," 2.

[114]Toguchi, 236.

[115]United States War Department, Field Manual 100-5, *Operations*, 1941, 2; United States War Department, Field Manual 5-5, *Engineer Field Manual, Troops and Operations*, 1941, 248.

Lieutenant General McNair envisioned that the combat units were to be streamlined, mobile, flexible, and lethal to match the high tempo style of the German Army. The United States Army achieved this by reconfiguring the square division into the triangle; it reduced the division to three regiments, and pooled specialized units used in occasional missions into corps or armies. This left the division with just enough support units to sustain its operations, and made it dependent on higher echelons to provide it additional capabilities. While this was true for the infantry division, its counterpart, the armored division would be just as streamlined as well. Although both these divisions were the primary unit that led the corps across the obstacle, they were limited in capabilities when it came to river crossing operations.[116]

An infantry division could operate alone to attack and maneuver over open terrain; however, when it had to cross its 2,000 vehicles and 14,000 personnel over a river, it was limited because of its organization and equipment. [117] An infantry division had one reconnaissance troop of 155 soldiers to collect information on the enemy's positions and multiple crossing points.[118] While this may not seem problematic, the division would be limited to observe the battlefield from only a ground perspective, and it induced risk to the operation by potentially sacrificing the element of surprise if detected. Also in the deep area, the division had two types of artillery units that could attack the enemy beyond the river. The medium artillery battalion supported the division with twelve 155mm towed howitzers with a maximum range of 14.64 kilometers, while the light artillery battalions supported the three infantry regiments with thirty-six 105mm towed howitzers with a maximum range of 11.44 kilometers.[119] To shape the conditions for the crossing,

[116]Greenfield et al., 11 and 273.

[117]United States War Department, Field Manual 100-5, *Operations*, 1941, 297.

[118]George Forty, *US Army Handbook, 1939-1945* (Great Britain: Sutton Publishing, 2003), 70.

[119]Ibid., 68 and 141.

the infantry division would risk this critical asset by placing it close to the river to attack the deep area. Meanwhile, in the close operations, the infantry division only had one combat engineer battalion that owned the crossing means of fourteen assault boats, eighteen six-ton pneumatic float boats, and fifteen pneumatic reconnaissance boats.[120] This was an issue because the equipment allowed the division to cross only troops, and it did not have the means to build bridges for both its personnel and vehicles. While the infantry division was very limited to conduct river crossings, the armored division would reflect the same limitations in its organization and equipment.

An armored division was a combined arms organization that was highly mobile with a lot of firepower and protection. Like the infantry, it could be independent in conducting operations but it was limited in crossing its 1,700 vehicles and 11,000 personnel over the river. The division had one cavalry reconnaissance squadron of 935 soldiers with half-tracked vehicles and armored cars to collect information, like its infantry counterpart, this type of unit provided only a ground perspective of the area while risking the element of surprise. To affect the enemy beyond the river, the armored division had a field artillery battalion of three batteries and eighteen 105mm self-propelled howitzer both with a maximum range of 11.43 kilometers.[121]This indirect fire capability also had the same limitations in the deep area; the division had to position these units closer to the river and risk losing its artillery units to the enemy's indirect fires. One important aspect of crossing an armored division was the means to cross the vehicles. Of the many vehicles it crossed, the weight of the light and medium tanks were of concern when moving over bridges.[122] The bridges or vehicle rafts must be able to support this heavy equipment; however,

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[120]United States War Department, Field Manual 5-6, *Engineer Field Manual, Operations of Engineer Units*, 1943, 116.

[121]Forty, 80.

[122]Ibid., 75 and 133. The light tank such as the M5 series tank weighed about 15.13 tons

the division only had one armored engineer battalion with forty pneumatic boats.[123] This meant that the division only had crossing equipment for personnel only, and no bridges or rafts for these heavy vehicles. [124] Without any crossing means, the division was limited to fording vehicles across shallow points on the river. While both the infantry and armored divisions' organization and equipment limited their ability to conduct river crossings, it could do this task under certain conditions. The enemy's defenses along the river must be light and the existing bridges intact and passable in order for these divisions to use their organic crossing equipment, doctrine called this a hasty river crossing. [125] When it came to crossing against a heavily defended area with impassable crossing areas, these types of divisions needed additional means from the corps to conduct the deliberate river crossing. [126]

In combat, the corps served as the immediate superior headquarters and provided resources to the divisions. It served as a pool for non-divisional units, which were units not assigned originally to the division but served a special purpose for occasional missions such as river crossings. While the corps was responsible for providing the means to conduct this operation, its organic organization and equipment was limited just like the divisions. The corps consisted of the headquarters company and its corps organic units, which included a mechanized cavalry squadron, field artillery observation battalion, signal battalion, and engineer topographic

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while the medium tank such as the M4 Sherman weighted about 32.5 tons.

[123]United States War Department, Field Manual 5-6, *Engineer Field Manual, Operations of Engineer Units,* 1943, 116.

[124]Greenfield et al., 374. On 21 July 1943, The Army Ground Force released a letter on the revised organization, which did not authorize the armored division with the tread way companies. Prior 1943, the armored division had tread way companies that gave it a capability to cross with two bridges all its vehicles over five hundred feet gaps.

[125]United States War Department, Field Manual 5-6, *Engineer Field Manual, Operations of Engineer Units,*1943, 85.

[126]Ibid.

company.[127] Its staff sections were a key contributor to crossing operations because it was robust enough to plan and synchronized the divisions with these specialized non-divisional units. For instance, the corps engineer section had six officers and ten enlisted soldiers where each member had a specific responsibility associated with river crossings.[128] Although the corps had organic units, it retained control over them because it facilitated the headquarters ability to conduct operations. During crossing operations, the corps cavalry squadron's mission was wider in perspective when compared to its divisional counterpart. The corps unit looked for general approaches and crossing areas for all three divisions while the division's reconnaissance troop collected specific information on these routes and crossing points for its three regiments. Regardless of these differences, the corps alone does not have the specialized units to support or reinforce its subordinate divisions. Therefore, it required certain units from army echelon to reinforce the division's capabilities in reconnaissance and indirect fires, crossing, and protecting the rear area. Although the army did pooled additional ground reconnaissance and artillery units to reinforce its subordinate units, its most important contribution to assist the shaping effort in the deep area was coordination for aerial support.

The German's use of air power to conduct aerial reconnaissance and bombardment during the Meuse River crossing proved to be an effective means to shape the conditions for this type of operation. When the United States Army released the 1941 Field Manual 100-5, it adopted the German practices and incorporated their ideas of using aerial units to support crossing operations; however, armies were the primary organization for coordinating for aerial units to reinforce the corps and divisions limited ground capabilities. The tactical air command was the primary United States Army Air Corps unit that supported armies. While the norm was

[127]XII Corps, "Report of Operations 31 August 1944 to 30 September 1944," 1.

[128]XII Corps, "Staff Operational Procedure: XII Corps Engineer Section-Standing Operating Procedure," 110.

that the air component supported the ground, rivalry between these two sides created contradicting doctrines that resembled a power struggle between the two components.[129] Despite these doctrinal challenges, the relationships formed between the commanders of the armies and tactical air commands would determine the unity of effort between the two. For instance, the close relationship formed between Third Army's Lieutenant General Patton and XIX Tactical Air Command's Brigadier General Weyland benefited the ground units with the air power needed to cross the Moselle.[130] The relationship between these two men facilitated the coordination between air and ground units for support in reconnaissance and bombardment. Between the army and the tactical air command, both organizations sent liaison officers to each other's headquarters to facilitate the coordination. To coordinate for aerial reconnaissance, divisions and corps submitted their mission request directly to the intelligence officer on duty at the tactical air command's operation center. To coordinate for air support missions, each corps and division had an air support party that directly interfaced with the army air operations cell, which was collocated next to the tactical air command's combat operations center.[131] The close proximity between these two organizations facilitated the request for the appropriate air asset that would execute the mission. The tactical air command provided the army with the capability to enable corps and division's river crossing operation by enhancing its ground reconnaissance and fires capabilities. These improved capabilities enabled corps and divisions to affect the deep area while reducing its risk to losing its ground units. While the army coordinated these efforts for this part of the battlefield, its allocation of non-divisional engineers units would provide critical capability for the close operation.

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[129]David Spires, *Air Power for Patton's Army: The XIX Tactical Air Command in the Second World War* (Washington D.C. Air Force History and Museum Program, 2002), 18.

[130]Ibid., 3.

[131]Ibid., 56.

Since divisions' engineer battalions were limited in crossing means, the armies provided additional units to reinforce it. The army controlled the allocations of the following engineer units with bridges: heavy pontoon battalions, light pontoon companies, trestle treadway companies. The heavy pontoon battalions were capable to build bridges to cross 10 tons and 20 tons vehicles such as the light tanks of an armored division. The battalion consisted of sixteen pneumatic pontoon bridges that could cross troops and vehicles over a length of over 500 feet, and four 25-ton pontoon bridges that could cross armored vehicles over a length of 500 feet. The light pontoon companies were suited to support the infantry units to include the infantry regiments of the infantry division and the three armored infantry battalions of the armored division. These companies built footbridges and ferried vehicles and soldiers with the infantry support rafts. The trestle treadway companies were suited to support the armored division with its 20-ton bridges. Given these bridge units, it gave the corps and divisions to cross almost every vehicle on their tables of organization and equipment. While there were a few exceptions, the most significant was the armored divisions' medium tanks such as the M4 Sherman, which weighed over 30 tons and exceeded the weight limit of the 20-ton bridge from the heavy pontoon and trestle treadway units. Fortunately, for the Americans in the European theater, the British Army introduced the use of the Bailey bridge, which had the weight capacity to handle vehicles of over 30 tons. The United States Army adjusted to using the Bailey bridges as part of their inventory by reorganizing the light pontoon companies to carry and build these bridges. Essentially, the light pontoon companies' equipment became obsolete when the division started to send tank battalions, tank destroyer battalions, and antiaircraft batteries to bolster its protection of the bridges on the far side.[132] Once the division crossed the obstacle, the corps assumed responsibility for the rear area. To do this mission, it would need units pooled within the armies.

[132]The General Board United States Forces, 1945, European Theater. "Engineer Tactical

The rear area required the armies to attach a different set of specialized units to facilitate sustainment operations and provide protection against ground and air threats. Some of these units were engineer, military police, anti-air, and chemical units. [133] Armies provided corps with engineer general service regiments to improve and secure the routes and bridges, and any other construction missions to support the corps or army headquarters. The engineer general service regiments provided the corps the capability to secure and improve the bridges while allowing the combat engineers from the corps and division remained forward. It also alleviated their workload by replacing these units' pneumatic float bridges with fixed ones. Thus, it freed the equipment for future use. Additionally, these engineers were also responsible to protect the bridges from sabotage, and conducted traffic control points with the military police along the routes and bridges.[134] In addition to engineers and military police units, chemical units and anti-air batteries protected the bridges from enemy air. The chemical units generated smoke to obscure the bridges from enemy bomber planes and anti-air batteries protected the bridges from enemy air attacks.

The armies proved invaluable in river crossing operations. It reinforced the limited capabilities of a corps and division and enabled them to conduct the most dangerous form of river crossings, the deliberate. The army's relationship with the tactical air command enhanced the corps and division' ground reconnaissance capability with air assets that could create the operational space necessary to plan and prepare for river crossing operations. It provided the dominating firepower to weaken the enemy combat effectiveness in defending the river. Aerial reconnaissance provided photographs of the river, which proved beneficial in determining dominating key terrain, launching points, and enemy locations. The army controlled the engineer

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Policies," Archives, Combined Arms Research Library, Fort Leavenworth, Kansas, 6.

[133]XII Corps, "Report of Operations 31 August 1944 to 30 September 1944."

[134]Devikis, 213.

bridge units that not only allowed crossing capabilities at both corps and division but it was able to create a reserve in the case for contingencies. One of the few challenges with these bridges was its capacity to support all the vehicles from the armored divisions. While the Bailey bridge was the solution, it was during combat operations when the United States Army adopted this equipment and reorganized its light pontoon company to carry and build these bridges. The army's engineer general service regiment proved valuable to the corps and division engineer by relieving them the responsibility to secure and maintain the bridges. The army also provided additional assets to protect the bridges and the rear area from enemy air attacks and ground sabotage while ensuring the lines of communication remain open with the front units. Overall, the United States Army in World War II was able to conduct river crossings because it had the capability to enable its subordinate units.

CONCLUSION

It was a hot desert summer in 2023. After the joint force landed on the enemy's territory, it established a base and began to survey the area ahead. From a distance away, its remotely piloted aircraft transmitted vivid images of two wide rivers that lay along the planned routes. With no way around these obstacles, they had to be crossed. The headquarters that took the crossing mission attacked with an armored and infantry brigade combat team, a marine expeditionary brigade, an allied brigade, a sustainment brigade, a fires brigade, an aviation brigade, a maneuver enhanced brigade, and a battle field surveillance brigade. Meanwhile, the division commander turned to his staff and asked how the force would shape the conditions in the deep area, how long would it take to cross, and what units would remain behind to protect the rear area. In the midst of silence, one officer, informed by his education at the Command and General Staff College, confidently answered the commander's questions providing him comfort in the feasibility of the plan. In the days before it executed this operation, the division conducted rehearsals with all the units to ensure synchronization at the crossing areas was solid. This rehearsal went smoothly since most of these units already trained this task together back in the United States. After the operation, the division commander noted three things in the after action report. First, the doctrine provided a common understanding for this complex operation. Second, he noted that training this task on an actual river with all the units and the crossing equipment proved beneficial to boosting confidence in execution. Last, he commented that his staff officers were very versed in divisional operations.

Today, 2013, twelve years of a counter insurgency centric operations in Iraq and Afghanistan questioned whether today's United States Army could conduct river crossing operations, not having preformed this task since April 2003 when the Third Infantry Division

crossed the Euphrates River in Operation Iraqi Freedom.[135] Since then, the United States Army had undergone a tremendous shift in doctrine, training, and organization to maintain relevant in its then current fight. In 2008, it released Field Manual 3-90.12, *Combined Arms Gap Crossing Operation*, which featured the categorization of all forms of crossing operations as gap crossings. Under this generic category, river crossing operations were either hasty or deliberate wet gap crossings. Despite these changes, this doctrine was similar to the ones of World War II because it provided a solid description in the tactical procedures necessary to plan and execute this task, and it served as an essential resource to inform staff officers, especially engineers, when advising the corps or division commander. While the current doctrine provided a viable procedure for wet gap crossings, training to become efficient in executing this task had been an afterthought and a victim of the counter insurgency operations that plagued the training scenarios.

Currently, units trained on the deliberate wet gap crossing through several unrelated venues. Corps and division prepared for this task through the use computer simulations. In this format, headquarters were primarily involved in the planning and coordination of this task. When it came to execution however, the computer simulated the units' movements. Thus, the main problem with the use of computer simulations vice conducting the task using actual equipment and terrain was that it absolved these organizations from the realities of the difficulty in physically sending a large force over an obstacle. Although the current doctrine suggested that brigade combat teams could conduct a wet gap crossing, it normally would not train this task in part because of the land requirements imposed on a multirole bridge company to practice its craft. For this unit to exercise its capability, it must operate in approved areas that had construction

[135] 11th Engineer Battalion, 29.

done to withstand the environmental impacts caused by the use of the heavy equipment.[136] Thus, this limits combined arms training with these specialized units. As for individual training, more specifically the education of officers that would serve in the staff of corps and divisions, their attendance at the Command and General Staff College exposed them to very little to gap crossing operations. The only few that may possessed any knowledge on this task were more than likely the engineer officers by way of their education at the basic and captains course. It would appear that the individual and unit training effort on this complex task seemed to be very bleak in comparison to the ones conducted in 1941.

In the midst of the recent combat operations, the United States Army decimated its ability to fight at the corps and division level, and more specifically, it had crippled these units' mobility capabilities. In 2004, it centered its primary tactical formation on the brigade combat team, which was a modular organization that did not have any gap crossing means. This formation was reliant on other organizations to provide this capability. For instance, it required a mobility augmentation company, which was an engineer unit with the armored vehicle launch bridges that provided the brigade combat team with the ability to cross very short gaps. Up until recently, the United States Army had recognized this missing requirement and again reorganized this unit. In the case of the armored brigade combat team, the special troops battalion converted to the brigade engineer battalion where it would have the specific equipment for limited gap crossings. While it may have this added capability, this modular organization would still have to rely on other units to provide it the crossing means required for a deliberate wet gap crossing. Considering all these changes in doctrine, training, and organization, this left many doubts on the ability for the current force to

[136]Russell Calloway, "Development of Training Areas for a Multirole Bridge Company," *Engineer*, Volume 42, (2012): 36-37.

conduct this difficult task if called on today. Because of this, one must study the past to inform better the decisions of the future.

The examination of river crossing in World War II sheds light on how a force should prepare and execute this task. In studying its respective doctrine, training, and organization and equipment, it revealed key insights that could benefit today's force. First, World War II doctrine dispelled the notion that river crossings solely fell on the hands of the engineers. Although they possessed the technical knowledge to make this operation work, it required a combined arms effort to move a large force across a dangerous obstacle. Second, rigorous and realistic training at the Louisiana Maneuvers of 1941 and the officer education at the Command and General Staff School prepared the force to conduct this type of operation. During maneuver training, entire corps and divisions exercised on an actual river with its crossing equipment, which allowed them to work through the inherent difficulties of synchronizing and coordinating various types of units. The Command and General Staff School formulated a curriculum that produced staff officers competent in crossing operations as well in other division and corps level tasks. Last, the United States Army had the ability to organize and equip units to shape the deep area, cross the river, and protect the rear area. While it did have its challenges in bridge equipment supporting heavy combat vehicles, it overcame this through modifying one of its units and updating the doctrine while in combat. Regardless of these adversities, the historic evidence supported that the United States Army in World War II was able to conduct river crossings because of its doctrine, training, and organization and equipment. Based on these findings, the following were considerations for today's Army:

1) Train for river crossings as you would do it. Corps and division command post exercise have tremendous value in training the staff, but there is much to learn by seeing the execution on an actual river while integrating a multirole bridge company. Since the current force foresees operations in a joint and multinational setting and that the current gap crossing doctrine was made

for both the United States Army and United States Marine Corps, it should consider conducting this training with sister services and other foreign militaries.

2) Embrace the deep and rear aspect to crossing operations. Too often, there were those who believed that river crossings operations only considered actions across the waterways. While this was very important, commanders and staff should always consider that there were activities in the deep area to shape the conditions for the actual crossings, and at the end of this, there were critical tasks in the rear area to maintain the momentum for the front line units.

3) Reexamine officer education. Officers that graduated from the Command and General Staff College should be competent in corps and divisional level operations. Thus, dedicate more time to educating these future staff officers on the complexities of these types of operations, to include the deliberate wet gap crossing.

It would seem that the next river crossing may be years down the road. Even so, the United States Army should consider preparation for this complex task as it transitions out of the current operations. In Clausewitz's comments on river crossings, the cost in casualties was too high to pay to figure out during a river crossing that it was more complex than originally thought.[137] As long the United States Army conducts combat operations abroad, it must always think before and beyond the gap because rivers will always be there.

[137]Clausewitz, 532-534.

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